

WHAT IS CLAIMED IS:

1. A free ink marking instrument for dispensing an ink,
comprising:
 - a housing;
 - 5 a reservoir for storing fluid ink within the housing;
 - a feed tube to convey fluid ink, communicating with the reservoir;
 - a porous tip disposed within the feed tube for conveying ink to a
substrate at a marking end of the tip;
 - a porous buffer disposed within the housing adjacent the feed tube and
10 configured for storing ink during periods of a decreasing pressure differential
between the reservoir and the atmosphere;
 - a passage formed between the outside surface of the tip and the inside
surface of the feed tube, wherein the passage has a mean thickness of about
0.010 in. to about 0.025 in.
- 15 2. The instrument of claim 1, wherein the end of the feed
tube closest to the tip is disposed at about 0.5 in. to about 1.5 in. from the
marking end of the tip.
3. The instrument of claim 1, wherein a portion of the
buffer is in disposed in capillary coupling contact to a portion of the tip.
- 20 4. The instrument of claim 1, wherein the tip comprises a
shoulder near the end of the tip disposed within the feed tube and further
comprising a second passage formed between the end surface of the feed tube
and the surface of the shoulder, the second passage in fluid communication
with the passage formed between the outside surface of the tip and the inside
25 surface of the feed tube.
5. The instrument of claim 4, wherein the second passage
has a mean thickness of about 0.002 in. to about 0.030 in.
6. The instrument of claim 4, wherein the end of the feed
tube closest to the tip is disposed at about 0.5 in. to about 1.5 in. from the
30 marking end of the tip.

7. The instrument of claim 1, wherein the capillarity of the tip is greater than the capillarity of the buffer and greater than the capillarity of the passage.

5 8. The instrument of claim 1, wherein the tip is secured against substantial movement in the axial direction.

9. A free ink marking instrument for dispensing an ink, comprising:

a housing;

a reservoir for storing fluid ink within the housing;

10 a feed tube to convey fluid ink, communicating with the reservoir;

a porous tip disposed within the feed tube for conveying ink to a substrate at a marking end of the tip;

15 a porous buffer disposed within the housing adjacent the feed tube and configured for storing ink during periods of a decreasing pressure differential between the reservoir and the atmosphere; and

a vent hole in the feed tube, the vent hole being disposed at a distance greater than the length of the tip, measured from the marking end of the tip.

20 10. The instrument of claim 9, wherein a vent hole is disposed at about 0.5 in. to about 1.5 in. from the marking end of the tip.

11. The instrument of claim 9, wherein a portion of the buffer is disposed in capillary coupling contact to a portion of the tip.

12. The instrument of claim 9, wherein the tip is isolated from contact with the buffer.

25 13. The instrument of claim 9, wherein the tip comprises a shoulder near the end of the tip disposed within the feed tube, and the end of the feed tube abuts the shoulder.

14. The instrument of claim 9, further comprising at least one additional vent hole.

30 15. The instrument of claim 9, wherein the capillarity of the tip is greater than the capillarity of the buffer and greater than the capillarity of the vent hole.

16. The instrument of claim 9, wherein the tip is secured against substantial movement in the axial direction.

17. The instrument of claim 9, wherein the tip is disposed in interference fit within the feed tube.

5 18. The instrument of claim 9, wherein the vent hole is circular and has a diameter of about 5 thousandths of an inch to about 25 thousandths of an inch.

19. A free ink marking instrument for dispensing an ink, comprising:

10 a housing;
a reservoir for storing fluid ink within the housing;
a feed tube to convey fluid ink, communicating with the reservoir, wherein the feed tube has primary and secondary ends at one extremity;
a porous tip disposed within the extremity of the feed tube having
15 primary and secondary ends;
a porous buffer disposed within the housing adjacent the feed tube and configured for storing ink during periods of a decreasing pressure differential between the reservoir and the atmosphere; and
a vent hole formed between a secondary end of the feed tube and a butt
20 end of the tip disposed within the feed tube.

20. The instrument of claim 19, wherein a vent hole is disposed at about 0.5 in. to about 1.5 in. from the marking end of the tip.

21. The instrument of claim 19, wherein a portion of the buffer is in disposed in capillary coupling contact to a portion of the tip.

25 22. The instrument of claim 19, wherein the capillarity of the tip is greater than the capillarity of the buffer and greater than the capillarity of the vent hole.

30 23. The instrument of claim 19, wherein the tip is secured against substantial movement in the axial direction.

24. The instrument of claim 19, wherein the tip comprises a shoulder near the end of the tip disposed within the feed tube, and the primary ends of the feed tube abut the shoulder.

5 25. The instrument of claim 19, wherein a plurality of vent holes are formed between secondary ends of the feed tube and the butt end of the tip disposed within the feed tube.

26. The instrument of claim 19, wherein the tip is disposed in interference fit within the feed tube.

10 27. The instrument of claim 19, wherein a vent hole has a mean radius of curvature in a range of about 0.002 in. to about 0.012 in.